

A difference in the Ears of Kangaroos

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Grey kangaroos are among the largest and most conspicuous of our Australian marsupials. Until recently they were considered a single species (*Macropus major*) but Poole and others discovered important reproductive differences between the eastern (now *M. giganteus*) and western (now *M. fuliginosus*) forms (Poole 1973, 1975; Poole and Catling 1974). Thus in Western Grey Kangaroos pouch occupancy, oestrus cycle length and gestation are all less than those for Eastern Greys and embryonic diapause has not been found in Western Greys.

Eastern Grey Kangaroos are common in the eastern states whereas *M. fuliginosus* occurs along southern Australia and in central and western New South Wales and southern Queensland. The species are sympatric in western New South Wales, western Victoria and eastern South Australia. Although similar in appearance, *M. fuliginosus*' coat appears darker and browner than that of *M. giganteus*. As well, Graeme Coulson from Melbourne University has suggested the ears of the two species appear different — those of the Western Greys seem to be less furred and darker (see Fig. 1).

In 1984 we examined ears of the two species from allopatric populations to see if these differences were real. The ears of Western Grey Kangaroos from Western Australia and western Victoria were shown to be different to those of Eastern Greys living in the eastern highlands in several ways: their ears were thinner, were less furred and the hairs on their ears were shorter and thinner (Kelly and Wallis 1985). We argued that the ears of Western Greys could thus act as better potential heat dissipators than the better insulated ones of *M. giganteus* and thus could aid species' thermoregulation in its generally hotter, more arid environment.

We still had not answered the question, however, whether the differences in ear structure were species specific or whether they simply reflected the colder environment of the study site chosen for the Eastern Greys. Clearly the solution would be found by examining ears of the two species where they lived together. Accordingly, we have studied the ears of road-killed kangaroos of both species where they live close together in western Victoria.

The significant differences in structure we found between the sizes of Eastern Greys living in the cold, wet parts of south-eastern Australia and those of Western



Fig. 1. Ears of grey kangaroos, showing inner surfaces. The ear of the Eastern Grey Kangaroo (*M. giganteus*) on the left is more densely furred and is thicker than that of the Western Grey Kangaroo (*M. fuliginosus*) on the right.

Greys living in hotter regions, continued to exist when the two species live together in a "mesic" environment. Thus Western Greys have thinner ears and the hairs on both the inner and outer ears surfaces are thinner and shorter than those of Eastern Greys. As well, ears of Western Greys appear less well furred, especially on the outer surface. The inner ear surfaces of both species

Table 1. Mean measurements (\pm SD) of the various characteristics of the ears of grey kangaroos living close together in western Victoria.

	<i>M. giganteus</i>	<i>M. fuliginosus</i>	Difference between means (t-test)
Length (mm)	110.8 \pm 11.1	97.2 \pm 11.1	P<.05
Width (mm)	80.6 \pm 6.8	73.8 \pm 9.3	NS
Thickness (mm)	2.6 \pm 0.4	1.7 \pm 0.1	P<.001
Surface area (mm ²)	6 462 \pm 716	5 122 \pm 982	NS
Hair width (inner ear) (μ)	45.0 \pm 9.2	28.7 \pm 5.6	P<.001
Hair width (outer ear) (μ)	44.8 \pm 7.2	29.9 \pm 5.4	P<.001
Hair length (inner ear) (mm)	15.1 \pm 3.3	10.1 \pm 2.1	P<.01
Hair length (outer ear) (mm)	17.1 \pm 1.0	11.8 \pm 1.5	P<.01

NS=not significant.

N=19 for *M. giganteus* and 35 for *M. fuliginosus*.

have naked areas, but the size of the naked or thinly furred patch in the Western Greys is larger than that in the Eastern Greys. As with our previous study, ear widths do not differ significantly between the species; in contrast, however, the Western Greys' ears were slightly shorter than those of the Eastern Greys in western Victoria, although total ear surface areas were not significantly different between species.

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OBITUARY

ARNOLD ROBERT MCGILL 1905-1988

Arnold McGill died at Moorebank, west of Sydney, on 29 July, 1988 at the age of 83.

Arnold's father was a shearer and Arnold was born on a property near the Warrumbungles on the 3rd July 1905. The family moved to Sydney in 1927, where they ran a grocery business. Arnold continued the grocery business until later becoming a manager with Major Food Centres. He retired at 65 in 1972 and was then able to visit with friends many new parts of Australia.

He first showed an interest in birds at the age of eight, when there was a series of cigarette cards depicting the birds. Later he saved his pocket money and bought "An Australian Bird Book" by J. A. Leach. In 1941 he joined the Royal Australian Ornithologists Union and attended the meetings of the New South Wales branch held monthly in Sydney in conjunction with the Ornithological Section of the Society. He became branch secretary of the RAOU in 1944 and after joining this Society in 1945 he became secretary of the Ornithological Section. He continued as secretary for both until 1960 and his annual reports for each were published in the "Emu" and the Proceedings of the Society. He was President of the RAOU in 1958-59 and elected a Fellow in 1965. He was assistant editor for the "Emu" under five different editors from 1947-69. Our Society elected him a Fellow in 1954 and an Honorary Life Member in 1972. He was Patron and Life Member of the New South Wales Field Ornithologists Club and Patron of the Cumberland Bird Observers Club. He was Honorary Life Member of the Bird Observers Club of Victoria and also of the South Australian Ornithologists Association.

Arnold had over two hundred publications to his name starting with "Notes on the Ground Cuckoo-Shrike" in the Emu in 1942. Before the "Twitchers" arrived on the scene he reported in the Emu three new sea birds, the Kelp Gull, *Larus dominicus*, Westland Petrel *Procellaria westlandica*, and Cook's Petrel, *Pterodroma cooki*. From his home in Arncliffe he regularly visited Botany Bay and studied the waders. In 1952 with H. T. Condon he produced a "Field Guide to the Waders" published by the Bird Observers Club of Victoria. The sixth and last revised edition was produced in 1974. 1970 saw the publication of his book "Australian Warblers" again published by the Bird Observers Club and in 1982 he was Scientific Editor for "Wrens and

Warblers" produced by the National Photographic Index of Australian Wildlife of the Australian Museum.

In 1958 our Society published "The Birds of Sydney", Arnold being joint author with Keith Hindwood. Today, this book has great significance when the distribution and status of the birds in Sydney is compared to that of 30 years ago. Another important book in 1958 for which Arnold was a co-author with Alec Chisholm and Keith Hindwood was the revised edition of Neville W. Cayley's "What Bird is That". This was the only book readily available both here and overseas giving all the birds on the Australian list and I was able to obtain a copy from Australia House, London in 1961. In the Reader's Digest Book (1976) "Complete Book of Australian Birds", he contributed 47 texts for various species in the waders, thrushes, shrike-thrushes, whistlers, warblers and the drongo. Arnold will be particularly remembered for the species index of the "Emu", volumes 1-50 published in 1953, volumes 51-60 in 1962 and volumes 61-70 in 1972. It was now possible to refer to the necessary volumes for the references to any particular species. His expertise and knowledge was recognized overseas and besides acting host to many overseas visitors he was invited by the editor, Sir Landsborough Thomson, to write the text for the Australian Magpies and the family Cracticidae for the "New Dictionary of Birds" (1964), which was produced to mark the centenary of the British Ornithologists' Union.

Arnold was a kind and helpful man and within a few weeks of my arrival in Australia in 1962 he invited me out to his home in Arncliffe and took me out to Botany Bay to view the waders there. The Australian fauna being new to me I sometimes consulted him when I had problems at the Australian Museum and he always helped sort them out or gave good advice. Thus it was very pleasing to learn in the Australia Day Honours List for 1984 that he had been awarded the Order of Australia Medal.

Arnold married Bertha Redman of Taree and they shared all activities together until she sadly died in 1982. To his only son Don and his wife Ruth and their three children we offer our deepest sympathy.

H. J. de S. D.